



Space News Roundup

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No. 10

Next week: 20th lunar conference

By Pam Alloway

Man's first step on the moon marked the beginning of a journey that has led scientists down a lunar soil and rock strewn path, revealing a wealth of knowledge.

Twenty years after that historic visit, scientists continue to uncover new discoveries from those lunar samples. Next week more than 700 scientists who work with and are interested in those lunar samples will meet at JSC for the 20th Lunar and Planetary Science Conference.

Registration for the conference is 6-9:30 p.m. Sunday at the Lunar and Planetary Institute. Sessions will begin at 8:30 a.m. Monday through the end of the conference Friday, and will be held in the Gilruth Recreation Center and auditoriums in Bldgs. 2 and 30.

The conference is an annual event that began in 1970 following Apollo 11 astronauts' return to Earth of the first lunar material in 1969.

"The typical NASA program lasts three or four years and is over," said Dr. Michael Duke, chief of JSC's Solar System Exploration Division and co-chairman of the conference with Dr. David Black, director of the Lunar and Planetary Institute. "This conference, in a very real sense, means Apollo never ended. Missions ended, but the science has gone on. People are still learning things."

The conference will feature 28 technical sessions and one special session. Additionally, a reunion banquet is scheduled at 7 p.m. Wednesday for the scientists, engineers, astronauts and managers who participated in the Apollo science programs. A limited number of banquet tickets are available for \$25 per person. The banquet at the South Shore Harbor Hotel will feature George E. Mueller, who was NASA associate administrator for space flight through the Apollo 11 mission, as its speaker.

A special session from 8-10 p.m. Tuesday is titled "Opportunities in Solar System Exploration" and will involve both U.S. and U.S.S.R. conference participants.



NASA illustration by Pat Rawlings, Mark Dowman and John Lowery

Bouncing across the rugged surface of the lunar highlands, a six-wheeled rover carries two explorers on a short mission from a wagon-train-like pressurized rover. Such lunar transportation vehicles could be used in any future exploration.

A special session will recapitulate the past 20 years of lunar science from 1:30-5 p.m. Wednesday. Five scientists will compare human understanding of the Moon as it was in 1969 and as it is today. They also will discuss remaining lunar science questions. Both the Tuesday special session and the Wednesday special review session will be held in the Bldg. 2 Teague Auditorium.

A JSC's Astronomy Seminar brown bag lunch is scheduled for noon Wednesday in the Bldg. 31, Rm. 193 conference room. Jim Oberg, Soviet space program expert, will give a "Soviet Shuttle Update."

The Planetary Society, in cooperation with NASA, will sponsor a symposium titled "Current Questions on Planetary Exploration" from 8-10 p.m. Thursday. Panelists

will include: Louis Friedman, executive director of The Planetary Society; James W. Head, from Brown University's Department of Geological Sciences; Michael Duke, academician Valery Barsukov, from the Vernadsky Institute at the U.S.S.R. Academy of Sciences; Dr. Mikhail Marov, from the Institute of Applied Mathematics, U.S.S.R. Academy of Sciences; and Dr. Lev Mukhin, from the Institute for Space Research, U.S.S.R. Academy of Sciences. Attendance is free but tickets are required. Tickets will be available at the conference registration and at the door.

Scientists from throughout the world have submitted more than 350 papers for the conference. Sessions span a myriad of topics. All conference Please see **LUNAR**, Page 4

Discovery gets new controller, launch target

The launch of *Discovery* and its five-man crew on Space Shuttle mission STS-29 is scheduled for Monday at 7:07 a.m. CST following a last-minute change out of one of the master events controllers that delayed the start of the mission.

The failure occurred during the flight readiness test of one of *Discovery's* two master events controllers (MEC) used to send signals to command and fire the pyrotechnic charges that separate the solid rocket boosters (SRB) and external tank (ET) from the Orbiter.

The MEC is located in the aft end of the Orbiter and was replaced with one from *Columbia*, which is currently being processed for a July flight.

The newly installed master events controller on *Discovery* was successfully tested Tuesday night and ordnance devices used for ET/SRB separation were installed and tested Wednesday.

Payload bay close outs have been completed and the payload bay doors were closed around the Tracking and Data Relay Satellite-D and its inertial upper stage (TDRS-D/IUS) Thursday evening.

The countdown for launch was scheduled to begin late Thursday night at the launch-minus-43-hour mark.

STS-29 crew members Mike Coats, John Blaha, Jim Bagian, Jim Buchli and Bob Springer are scheduled to complete pre-flight training this morn-

ing and fly to the launch site in NASA T-38 jets this afternoon.

Meanwhile, *Atlantis* was scheduled to move from the Orbiter Processing Facility to the Vehicle Assembly Building (VAB) early today. Once in the VAB, work will begin to mate the Orbiter with the external tank and solid rocket boosters for the Magellan launch scheduled for April 28. Rollout of *Atlantis* to the launch pad is currently planned for March 24.

Deployment of STS-29's primary payload is scheduled to take place on *Discovery's* fifth orbit, at a mission elapsed time (MET) of 6 hours, 13 minutes.

A backup TDRS deployment opportunity is available on day two of the mission, when the crew is scheduled to begin work on its secondary activities: the Space Station Heat Pipe Advanced Radiator Element (SHARE), the Chromex plant root development experiment, the Protein Crystal Growth (PCG) experiment, and two student experiments that will look at microgravity bone healing in rats and chicken embryo development.

On days two and three, the crew will use the IMAX large-format camera to gather material for a new film on global ecology.

The crew will begin deactivating experiments on day five, and on day six will prepare for and make its deorbit burn and landing at Edwards Air Force Base at 8:14 a.m. CST.



STS-29

Fletcher plans Thursday visit

NASA Administrator James C. Fletcher will be at JSC on Thursday, in what may be his last visit as administrator.

Fletcher will address badged civil service employees at 10 a.m. in the Bldg. 2 Teague Auditorium.

Supervisors are encouraged to permit employees who can be spared from duty to come and hear Fletcher's remarks. Fletcher's talk will be carried live on Channel 6 of the JSC closed-circuit television system for those unable to attend.

Earth Observations

Seeing the whole world without ever leaving their desks

By James Hartsfield

The men and women of the JSC Space Shuttle Earth Observations Office (SSEOO) have seen the whole world thousands of times—without ever leaving their desks.

The Earth Observations Office trains Shuttle crews in photographing the world and then catalogs, analyzes and conducts scientific investigations of the result.

"You can't work on this project without getting a global view of what the Earth is and how it is changing," SSEOO Manager Chuck Wood said. The office works with astronauts to chronicle the Earth's ever-changing face, charting the differences, whether the changes are wrought by mankind or Mother Nature—and whether they are for better or for worse.

"One of the most remarkable things about this work is that, long after we are all gone, the photographs will remain," Wood said. "They will always show how the Earth looked in 1988, in 1989 and so on. They're historical, and they are a national resource."

Although the views they work with are taken from space, terrestrial disciplines dominate the office—employees specialize in meteorology, geology, biology, oceanography and environmental studies. They are

observers of the air, land, sea and life on a uniquely global scale.

But they can't often stand back and look at the planet as a whole, they're too busy zeroing in on targets of particular interest. Somewhere on Earth, something always is happening. Tropical rain forests are being cleared and burned, sometimes leaving barren ground in their place. A 20-year drought may be ending. A hurricane is brewing. A river is clogging with silt from accelerated erosion. A volcano is stirring.

Events such as these are followed by the office, and narrowed to specific targets of interest for space photography. Prior to each Space Shuttle mission, a special computer program, the Automated Mission Planning System (AMPS), takes the planned inclination and altitude and prints out a map detailing the orbits that will occur. Nighttime orbits and orbits that fall during high-activity work times for the crew are deleted, leaving a map of possible Earth observation opportunities.

Normally, about 25-30 specific target areas are outlined for a Shuttle mission. But those targeted areas are only part of the hoped-for results from each mission. The rest depend on training the eyes and brains of the crew, Wood said.

Please see **WHOLE**, Page 3



JSC Photo by Benny Benavides

Mike Helfert, left, and Chuck Wood, manager of JSC's Space Shuttle Earth Observations Office, discuss the detailed imagery returned by the crew of STS-26.

JSC

People

Barnett gets new Life Sciences job

James H. Barnett Jr. has been assigned as assistant to the director of Space and Life Sciences for the National Space Transportation System (NSTS), effective immediately.

Barnett, who had been manager for the Medical Sciences Division's microgravity vestibular investigation, will assume the NSTS duties previously assigned to Timothy T. White as assistant to the director for NSTS and Space Station.

White becomes assistant to the director for space station, responsible for managing Space and Life Sciences activities in the Space Station Freedom Program.

McNeely receives secretarial honor

Betty L. McNeely, secretary to Keith McQuary, chief of Center Operations' Plant Engineering Division, has earned the Marilyn J. Bocking Excellence Award.

McNeely, who has been senior secretary in Plant Engineering for five months, was cited for her thoroughness, attention to detail, professionalism and effectiveness. She received a plaque and a \$500 cash award.



McNeely

JSC

Dates & Data

Today

Cafeteria menu—Special: Salisbury steak. Entrees: baked scrod, broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower au gratin, mixed vegetables, buttered cabbage, whipped potatoes.

Saturday

Lunar pole conference—A Lunar Polar Probe Conference is scheduled for March 11-12 at the Nassau Bay Hilton. The conference is designed to formalize plans for the development, funding and launch of a small satellite to explore the polar regions of the Moon. The conference is sponsored by the National and Houston Space Societies, Milwaukee Lunar Reclamation Society, University Space Society, New Orleans Space Society, Space Studies Institute, Space Frontier Foundation, ETM Inc. and Third Millennium Inc. Speakers will include Dr. Wendell Mendell of JSC. For more information, call 643-6373.

AIAA meets—The American Institute of Aeronautics and Astronautics Houston Section will host a visit by a delegation from its sister section of the Shanghai Astronautical Society at 1 p.m. March 11 at the American Host Motel on NASA Road 1. A dinner reception will begin at 6 p.m. For reception reservations or more information, call Walter Lueke, x35939.

Monday

Lunar conference—The 20th Lunar and Planetary Science Conference, sponsored by JSC, the Lunar and Planetary Institute (LPI) and six other professional societies, will be March 13-17 at the Gilruth Recreation Center. A special Monday afternoon session in the Bldg. 2 Teague Auditorium will

review current understanding of the origin and history of the Moon, comparing that to pre-Apollo concepts.

Lunar base symposium—A symposium on current thinking about lunar base programs will be presented at 8 p.m. March 13 in the Bldg. 2 Teague Auditorium. Speakers will include JSC's Dr. Michael Duke, G. Jeffrey Taylor, University of New Mexico; Harlan J. Smith, University of Texas; Larry Haskin, Washington University; and Harrison Schmitt, Apollo 17 astronaut.

Cafeteria menu—Special: beef and macaroni. Entrees: ham steak, Parmesan steak. Soup: chicken and rice. Vegetables: green beans, carrots, au gratin potatoes.

Tuesday

Lunar conference—A special Tuesday evening session of the 20th Lunar and Planetary Science Conference will focus on NASA Opportunities in Solar System Exploration at 8 p.m. in the Bldg. 2 Teague Auditorium. Participants will include Lennard Fisk and Samuel Keller, NASA associate and deputy associate administrators for Space Science and Applications, and V. Barsukov of the Soviet Vernadsky Institute.

Cafeteria menu—Special: Mexican dinner. Entrees: potato baked chicken, barbecue spare ribs. Soup: tomato. Vegetables: squash, ranch beans, Spanish rice, broccoli.

Wednesday

Apollo reunion banquet—A reunion banquet for scientists, engineers, astronauts and managers who participated in the Apollo science programs will begin with a social hour at 6 p.m. March 15 at the South Shore Harbor Hotel. Dinner will be served at 7 p.m. Dr.

George E. Mueller, associate administrator for space flight through the Apollo 11 mission, will be the featured speaker. A limited number of tickets will be available for \$25 per person. For more information, call Pam Jones at the Lunar and Planetary Institute, 486-2150.

Cafeteria menu—Special: meatloaf with Creole sauce. Entrees: baked scrod, liver and onions, ham steak. Soup: seafood gumbo. Vegetables: beets, Brussels sprouts, green beans, whipped potatoes.

Thursday

Astronomy seminar—Jim Oberg will provide an update on the Soviet space shuttle "Buran" for the JSC Astronomy Seminar at noon March 15 in Bldg. 31, Rm. 193. For more information, call Al Jackson, x33709.

Cafeteria menu—Special: smothered steak with dressing. Entrees: chicken and dumplings, shrimp and pork egg rolls. Soup: beef and barley. Vegetables: spinach, cabbage, cauliflower au gratin, parsley potatoes.

March 17

Cafeteria menu—St. Patrick's Day special: corned beef, cabbage and new potatoes. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

March 22

Astronomy seminar—The JSC Astronomy Seminar will present an audiotaped discussion with Dr. Robert Kraft of the University of California, Santa Cruz, about the Keck Telescope at noon March 22 in Bldg. 31, Rm. 193. For more information, call Al Jackson, x33709.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays:

General Cinema (valid for one year): \$3.50 each.

AMC Theater (valid until May 31): \$2.95 each.

Sea World (San Antonio, year long): adults, \$17.25; children \$14.75.

"Revival" (March 10,11,17, 8:15 p.m., League City Civic Center): \$5. Houston Rockets vs. New York Nets (March 11, 7:30 p.m., Summit): \$7.

"Pericles, Prince of Tyre" (April 22-28, 8 p.m., Satellite Theatre, UHCL): \$4.

Delta Downs Trip (March 18, includes transportation, soft drinks,

admission to clubhouse): \$16.

Delta Downs Overnight Trip (March 18-19, includes transportation, champagne welcome, admission, accommodations at Beaumont Hilton, Sunday brunch): \$50.

Easter Egg Hunt (March 25, includes hunt, photo with Easter Bunny, magic show, petting zoo, clowns, jugglers, refreshments): adults \$1; children \$3.50 (tickets go on sale March 13).

Bluebonnet Trip (April 8, includes transportation, visit to miniature horse ranch and Rose Emporium in Independence, lunch buffet): \$15.

Bluebonnet Trip (April 8, includes transportation, stop at Bluebonnet Festival, picnic lunch at park, visit to miniature horse ranch): \$13.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property

Sale: 60 acres, 3 mi. from Karnes City, TX, on Hwy. 80, 50 mi. from San Antonio. 783-9164.

Sale: League City, 2.06 acres near schools, city water and sewer avail., \$39,950, OBO. 554-6695.

Rent: Kauai, 2-1.5 condo, breathtaking view of the Pacific, high atop the cliffs of Princeville on island's north shore, \$500-\$700, depending on season. 714-768-3840.

Sale: League City, 3-2-2, ex. cond., cul-de-sac, landscaped, fenced, all brick, FHA 10% fixed assum., \$3,000 equity, \$740/mo. David, x35464.

Sale: Bedias, TX, 27 mi. west of Huntsville, 4-2-2, 2,200 sq. ft., on 5 acres, ex. cond. 339-1197.

Rent: Beach house near Galveston, front row, adjacent to San Luis Pass fishing pier, 2 BR, weekends or weekly. 894-0979.

Sale: 1982 14' x 72' Fleetwood Festival mobile home, 2-2, CA/H, appl., ex. cond., \$9,000, OBO. 474-4306 or 409-925-5554.

Sale: Friendswood/Sun Meadow Estates, wooded lot in estab. neighborhood, cul-de-sac, bordered by stream and golf course on 2 sides, approx. 245' deep and up to 86' wide, util. on site, \$31,500. Doug, x32860 or 486-7412.

Lease: Friendswood/Heritage Park, new section, 3-2-2, FPL, large kitchen, fence, new paint, ceiling fan, \$625/mo. 482-6609.

Sale: Middlebrook, 3-2-2, study, FPL, wet bar, covered patio, large lot, ex. cond., FHA assum., 10%. 480-9363.

Sale: League City, wooded lot, 50' x 100', 2 blks. from Clear Lake on lakeside, near Southshore, \$15,000. x37118 or 334-1090.

Sale: Big Bend area hunting land, 160 acres, \$150/acre, OBO. 337-4051.

Sale: Alvin, 3-2-2-2D, .67 acres, FPL, no city taxes, brick, gas and elec., \$56,900, assumption or \$58,900 cash or new loan. x38456 or 388-1090.

Rent: Lake Livingston waterfront, 3-2, fully furnished, covered decks, pier, new cond., wood FPL, ex. fishing, week or weekend. 482-1582.

Sale: Clear Lake Shores, 80' x 100' lot, trees, grass, fenced, \$24,800. Don, 333-3313.

Lease: Heritage Park (new section), 3-2-2, 1 blk. from school, FPL, fenced, good cond., \$600/mo., \$600 dep. 486-8551.

Sale: Friendswood, 3-2-1, near Westwood elem., lots of trees, covered deck, assum. at 10%, \$56,900. Sam, x35602 or 482-9601.

Sale: Forest Bend/Friendswood, 3-2-2, den, screened-in porch, ceiling fan, new paint,

assume 9.5%, \$517/mo. Nick, x31920 or 996-7917.

Cars & Trucks

'77 Buick LeSabre, 2 dr., auto., runs good, looks good, new battery, V-8, \$1,100, OBO. 282-3385 or 532-1012.

'87 Chevy S-10 Tahoe P/U, V-6, like new, A/C, AM/FM cass., A/T, gages, tilt steering, cruise control, full carpet, fabric seats, tool box, bed liner, heavy duty tow package. Guess, 649-5092.

'82 Ford F150 XLT Lariat Supercab, new motor under warr., new tires, shocks, brakes, exhaust, stereo, tinted windows, \$4,600, OBO. 282-6613 or 482-7570.

'84 Escort GT, black, 2 dr. hatchback, tinted windows, sun roof, A/C, AM/FM cass., cruise control, \$3,200. 333-4285.

'71 Lemans Sport, one owner, 400 C.I.D., blueprinted, Positrac, 400 T.H., etc., needs some work, \$2,700, OBO. Ron K., x34713 or 333-2273.

'84 Chrysler Laser, blue, 30K mi., 5 spd., A/C, AM/FM, sunroof, good cond., \$3,700, OBO. 333-6686 or 480-8772.

'81 Chev. P/U, Silverado, blue, 305 V-8, auto., A/C, AM/FM cass., camper, 87K mi., no damage, good paint and tires, \$2,900. x37883 or 337-5482.

Cycles

Yamaha 80 cc Moto Four wheeler, new cond., \$800. 482-4365.

Boats & Planes

31' Chris Craft Sportsman, twin Mercruiser engines, engines have very low hours, ex. cond., shower, toilet, sleeps 6, refrig. 339-1197.

'75 25' Sea Ray Hardtop Cruiser, 188 Mercruiser, galley, dinette, electronics, equipped for offshore and cruising, tandem trailer, \$7,500. Don, 333-3313.

'88 Bayliner 2455 Ciera Sunbridge, OMC 230 I/O, CB, depthfinder, shore power, full instrumentation, curtains, AC/DC refrig., electric/alcohol stove, twin batteries/automatic charger, trim tabs, presently in water and better than new, \$24,500. Jim, x39872 or 333-4228.

Audiovisual & Computers

Commodore transformer for computer, new, \$10. Tex Ward, 488-5445.

IBM compatible XT, 640K, CGA monitor, 20 meg hard disk, 101 keyboard, 2-360K floppy disk, 8 MHz turbo, Norton SI-3.1, serial, parallel, clock, 2400 baud internal modem, all manuals, ex. cond., \$995. 943-0113.

Commodore 64 computer w/model 1541 disk drive, used approx. 20 hrs., software incl., \$350, OBO. 409-945-7584.

Atari 7800 w/joysticks, 1 yr. old, w/13 new games, 7800 Karateka, baseball, Mario Bros., Dig Dug, F-18 Hornet, was \$350, now \$250, OBO. 280-2039.

Hewlett-Packard color Pro Plotter model

7440A, 6 mos. old, 8 pens, cable and pens incl., good for CAD, \$775, OBO. 486-5009.

Apple IIe Enhanced, A.E. Ramworks 80 column memory card, 385K RAM, 2 disk drives, parallel printer port, 300 baud modem card, CP/M card, NEC monochrome monitor, system saver w/fan, programs, manuals, \$900, OBO. John, 991-3753.

Apple II+, 64K RAM, NEC color monitor, 1 disk drive, joystick, programs and manuals, \$300, OBO. John, 991-3753.

Household

One couch, loveseat, and Lazy Boy recliner/rocker in very good cond., all for \$650, not sold separately. 482-4365.

5-pc. bedroom set, 2 end tables, mirror, dresser, king size headboard, particle wood, dark brown, \$300, OBO. Alan, x32554 or 334-5478.

6-pc. Reff solid oak contemporary bedroom set, ex. cond., w/2 nightstands, 2 dressers, 1/2-dresser w/fold-out desk and planter, high-quality comm.-grade, was \$3,500, now \$950. x36614 or 486-6564.

Antique hump back steamer trunk, 34L x 21W x 28H, has 95% HDW/trim, \$195; elect. dust collector for furnace, H/P, "Edison", w/pressure switch, 800-1600 CFM, was \$380, now \$150; mirrors, gold-veined (2), 45 x 91 1/2, \$100/ea. Doug, x32860 or 486-7412.

Frigidaire 16 cu. ft. refrig.-freezer, in good shape, \$150. 488-2754.

Couch, queen hide-a-bed, rust vinyl, ex. cond., \$200; drop leaf table and 2 chairs, hard rock maple, \$150; platform rocker, gold, \$100. J.E. Baker, 339-2386 or Paula, 332-2849.

Two identical baby cribs, complete, \$75/each, OBO. 280-8178.

Queen waterbed, \$75; twin bed, \$75; sofa, \$50; dresser, \$75; 10 speed, \$50; vacuum, \$30; coffee table, \$25, misc., OBO. Dave, 482-8494.

Kitchen Aid food processor and access., used 3 times, like new, \$150. Marilyn, x32116.

GE matching harvest gold washer and dryer, rebuilt timer, water controls, heater elements, etc., auto. settings, \$200. Tony, 280-1564 or 482-4156.

7-pc. French Provincial antique white w/gold trim, girls/teens bedroom furn., full size headboard, 2 nightstands, dresser, hutch, desk and chair, ex. cond., \$500, OBO. Cathy, x33851 or 996-8835.

Wanted

Want gas dryer in ex. cond., reasonable; hide-a-bed in ex. cond. 332-5830.

Want to rent recreational vehicle for week of May 28-June 4, 1989. Betsy, x34443.

Want large size mission operations patch, 9 1/2", "new" design, need at least one, but could use three. Kyle, x38653.

Want to trade equal value. organ for land, car, truck, or boat of equal value, OBO. 337-4051.

Want to assume condo or house loan in Clear

Lake, desire 10% APR or less. 666-8119

Pets & Livestock

1 yr. old dog, Retriever mix, free. Tex Ward, 488-5445.

1 yr. old flat coated black Retriever, male, free to good home. 337-1896.

Pure Breed Doberman pups, born 1/20/89, reds and blacks, wormed, first shots, duclaws and tails removed, \$100/each, parents on premises. Merrell, x37570 or 559-2017.

Free to good home, 7 mo. old female Lab/ Spaniel, white/brown spots, all shots and spayed. x32423 or 481-3257.

Rottweiler puppies, 6 wk. old, no shots, males, \$75, females, \$50. 482-1126.

Loving cat needs good home, declawed, calico, 1 1/2 yrs. old. 333-6216 or 488-1988.

Pitt Bull puppies, UKC registered, "PR", born January 9th, some tan, some brindle, \$150. 473-7698.

Musical Instruments

Bunde clarinet, ex. cond. 332-5830.

Lost & Found

Found engagement solitaire diamond ring, turned into security, Sat. Feb. 18. x34321.

Lost in parking lot behind Bldg. 2 on 2/22/89, 18K gold bumble bee w/approx. 15 sm. diamonds and 2 rubies, reward. Jean Tarpley, x30392.

Lost ladies 6 diamond ring, yellow gold, sz. 5, each diamond makes the center of a flower, lost in Bldg. 11 on Monday, 2/6, reward. Jana, x31653 or 532-3008.

Miscellaneous

Wire wheel covers for Monte Carlo; men's western boots, size 10; sofa and loveseat in earthtones. 332-5830.

AM/FM car cass., still new in box, \$80; 25" Zenith remote control console TV, was \$1,000, now \$250; Trackstar Apple II computer card for your IBM PC/clone, was \$500, now \$350. Tony, 280-1564 or 482-4156.

Stevens Mod. choke 12 gauge pump shotgun in good cond., uses 3" Magnum and 2 3/4" shells, beautifully refinished stock, \$100. Terry, 282-3288 or 474-5639.

Southwestern Bell cellular phone, \$300; Radio Shack portable cellular phone, 6 mo. old, \$600. Don Holick, 333-3313.

Sears Craftsman riding lawnmower, 11 hp., 5 spd. trans., 36" cent, rear bagger incl., used 1 summer, \$900. Steve, x35450.

Wedding ring set, white gold, Marquis cut, 37 point engagement ring, w/matching wedding band, \$950. Earl Rubenstein, x34807 or 326-2354.

Sears garden tiller, few hours on the engine, easy to start, 8 hp, two forward drives, one reverse. Marilyn, x32116.

Aquarium, 30 gal., oceanic, w/light and stand plus all access., \$250, OBO. Carlos, x38879 or 554-7727.

DP Gympack 1500 XL deluxe exer. station, bench, 150 lbs., ex. cond., \$150. Jeff, x31974 or 997-1538.

Holley model 4150 carburetor, double pumper, mechanical secondaries, dual fuel lines, 650 cfm, like new, \$100; accel. dual point vacuum advance distributor w/new points and cap. for small block Chevy, ex. cond., \$50. Jeff, x31974 or 997-1538.

Camper shell for long wheel base Ford truck w/carpeted custom built storage compartments, ex. cond., \$200, OBO. 945-2486.

Free bricks. Terry, 282-3288 or 474-5639.

2 1987 IROC wheels/tires, Goodyear Eagle, P245/50 VR16, \$250. Tony, x35966.

Fiberglass camper top, LWB, no liftgate, \$75; 4 15" white spoke wheels w/chrome centers and locks, Chevy, \$40. x38456 or 388-1090.

24 signed and numbered Windberg limited edition prints, will sell separately or as a set. Tom, 332-3125.

Sale or rent utility trailer, 5' x 6', \$100. Sam, x35602 or 482-9601.

Sears elec. typewriter, ex. cond., \$65. Pat, SR&QA, Bldg. 10, x33858 or 332-1262.

Centurion men's racing/touring bike, indexed shifting, aero brakes, quick release hubs, cateye micro cyclecomputer, 2 bottle racks, ex. cond., \$275. x38487.

Art table w/formica top, about 3' x 4', \$25. Tex Ward, 488-5445.

Unused U.S. commemorative stamps at post office prices, 3c to 22c mixture, \$10. Jeff, 333-7010 or 482-5393.

Wedding gown, veil, size 5, silk chiffon and lace accented w/seed pearls, have pictures, \$300. 332-2229.

Remington Mod. 700 BDL, 30-06, carved stock, Pachmayr kick pad, Leupold 4X scope, \$495; Colt (Commanding Officers model), 45 auto., 1 of 5000, \$775. Bill, 332-5057.

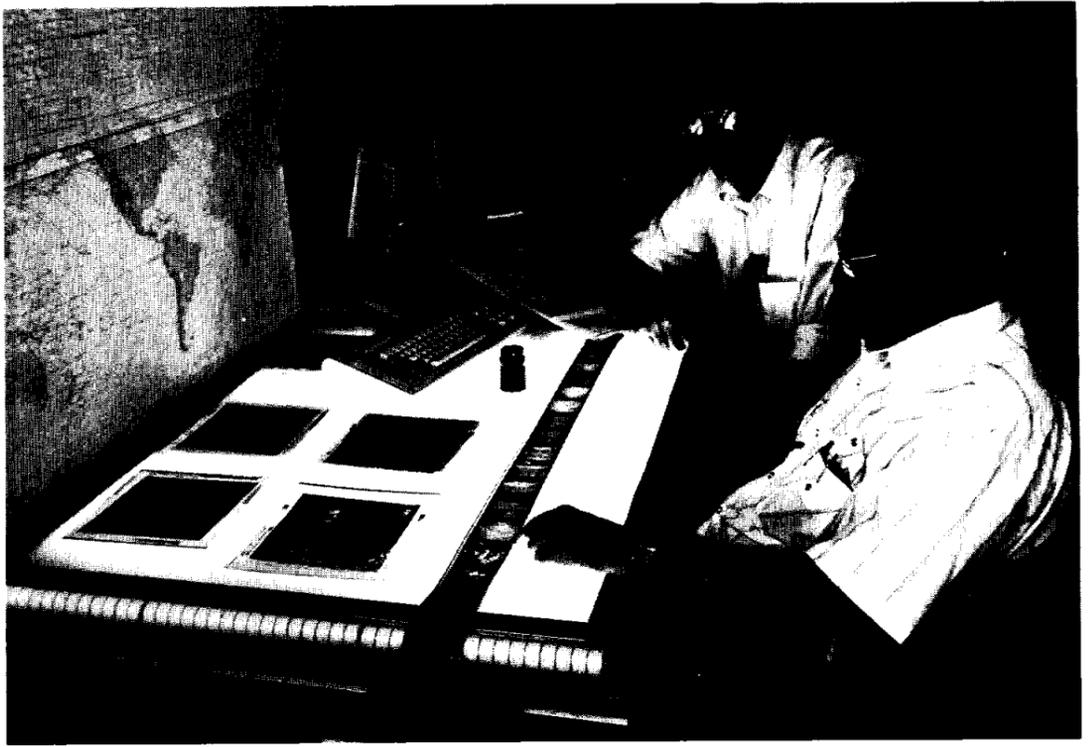
Golf clubs, new set, 1 and 3 metal woods, Tour model System II irons, 1-9, PW, SW (peripheral weighted) putter, and golf bag, \$300 or parts. David, 554-5514 or 332-3827.

Ready to fly, radio controlled airplane (Aerobatic) w/motor (S.T. 60) and radio (Kraft 7 channel - 76 series), \$275, OBO. Carlos, x38879 or 554-7727.

Ruger, "Speed-Six", stainless, 38 special, snub-nose, Pachmayr grips, \$260; Charter Arms, "Pathfinder", stainless, 22 long rifle, \$195; Glock, Model-17, 9 mm, seventeen round clip, official side arm of Austrian Army, two clips, \$435; Smith & Wesson, Model-12, snub-nose, 38 special, \$245, all guns brand new in boxes. Charlie, x34071 or 333-4681.

Antique wheel chair, wooden, very strongly made; antique iron bed; antique seed sowers, (hand crank); kittens, Siamese, blk. and white, grey; quilts and quilt tops; antique telephone on wall; pedal sewing machine; revolving bookcase, wooden, sits on table; walking plow, 1 horse and big plow point; old record player; antique egg crate, wooden; small spinning wheel, 90' rope. 783-9164.

Wes Palmer, left, and Ray Nelson, work at a light table in their Bldg. 31 office, cataloging 70-millimeter film taken by Space Shuttle astronauts.



WHOLE WORLD CATALOG

Earth Observations trains astronauts to record ever-changing face of planet Earth

(Continued from Page 1)

After a crew is assigned to a specific mission, one of the crew members is given the lead Earth Observations responsibility by the commander. A lead responsibility for each mission also is assigned to one of several specialist scientists on the SSEOO staff. The SSEOO staff prepares a full-color Earth Observations Preflight Manual for each mission, a book that details each science target, complete with maps, histories and past satellite or Shuttle photos. A manual is given to each crew member.

Crews receive about 12 hours of mission-specific briefings from SSEOO personnel. The training covers scientific views of the Earth, oceans and atmosphere.

"We find that every crew we talk to is more enthusiastic than the last," Wood said. "Everybody who works on this project really likes it."

"For me, a person who likes to travel," added SSEOO scientist Bill Daley, "It's great. When I see the astronauts photography, I get to see the whole Earth without ever leaving the ground."

The global aspects of their work are apparent in every member of the SSEOO staff—they have become geographers equaled by few. From a glance at a random photo of virtually any place on Earth, they often can tell you immediately the country, the area, the geology, the meteorology and the history of the region—and they may throw in a very educated estimate of the longitude and latitude of the photo's center point, tell you when it was

taken, by whom and why and what other photos of it exist.

Several specialists in SSEOO are on the staff. Three others work with the office as outside science investigators. The five NASA staff specialists include Wood, whose passion is the study of volcanoes; Mike Helfert, an expert on deforestation and its environmental effects; Kam Lulla, also an environmental geographer; Dave Amsbury, a geologist fascinated with the origin of landscapes and landforms; and Vic Whitehead, a meteorologist.

SSEOO's goal is to pass on as much of this expertise as they can to each Shuttle crew. "We try to give them as much detailed information as possible," Wood said. "We tell them what they're going to see. It's a whole lot different from most of the technical things they do, and it's beautiful. Many astronauts will get hooked on Earth Observations after their first flight."

Using equipment installed prior to *Discovery's* return to flight in 1988, the office can consistently monitor images of almost any spot on Earth taken by any of three geosynchronous and two polar-orbiting satellites. In the office's Meteorological Interactive Data Display System (MIDDS) workstation, current images of the Earth fill a host of screens.

Although also used in preparation for a flight, the MIDDS station goes into high gear after launch. It is manned 16 hours a day, searching for opportune events for space photography. Updates on conditions at selected sites plus any new photography requests are sent to the crew

each flight day by SSEOO.

Following a mission, the Earth Observations film is developed overnight, available for study the day after landing. The first glance at a mission's photography is always breathtaking, said Helfert. "Every flight, we get the best picture we've ever had of something—or a photo of something we've never seen before," he said.

The photographs are cataloged by SSEOO scientists Ray Nelson and Wes Palmer. Nelson and Palmer use a plethora of maps and mission information to plot the longitude and latitude of each photo. They have cataloged every Earth photograph taken from a Space Shuttle—about 35,000 from the first 24 missions.

"Without this work, the photos would be worthless. You wouldn't know where it's from or when it was taken," Nelson said. "We provide a database." The Shuttle photographs are added to the 65,000 photos of Earth taken by astronauts before the Shuttle program. From Mercury through Apollo, every photograph ever taken of Earth by an astronaut is stored in SSEOO.

Shuttle photography is an excellent complement to satellite imagery of the Earth, but it also has an unmatched advantage. Astronauts have the uniquely human ability to spot interesting phenomena and photograph it immediately.

"Astronauts take photos of things we didn't know were happening," Wood said. Shuttle photography has been responsible for discovering several previously unreported volcanic eruptions; for detecting internal waves deep within the

oceans, able to be seen from space but from nowhere else; for discovering very ancient impact craters; and for many other firsts.

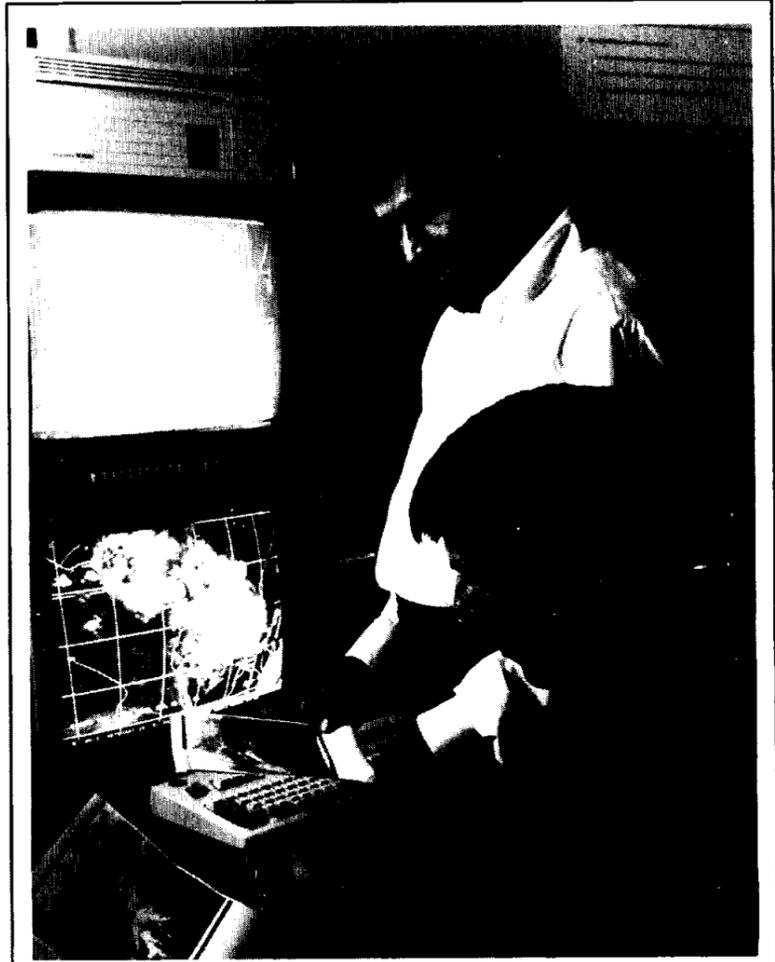
When astronauts use a 250-millimeter lens, Shuttle photography matches the resolution of Landsat satellite imagery. But having an astronaut holding the camera provides unmatched flexibility.

"All an astronaut has to do is unscrew the 250-millimeter lens and put on a wider angle lens and we will get a totally different view," Wood explained. "And the Shuttle provides photos of an area at different times of day, with different sun angles that can highlight features unseen at other angles."

Shuttle photos can be taken using infrared film, or they can show the Earth as it appears to astronauts. "Our photos are most often taken on normal film, and the colors we see are how the Earth really looks," Wood said.

SSEOO was officially organized in 1983, but SSEOO personnel have been involved with every Shuttle mission since STS-5. The future is bright. Plans are under way to digitize Shuttle photos, making them more valuable by allowing computer enhancement and study. Also, the possibility of using Shuttle photos to make topographic maps is being investigated.

Every photo taken by astronauts from space is in the public domain, and any photograph from the Shuttle is available to the public for only the cost of reproduction, Wood said.



Left: Leslie Boedeker, a Lockheed employee, works at her Automated Mission Planning System (AMPS) terminal. Right: NASA's Kam Lulla, standing, and Dave Helms, another Lockheed employee, monitor weather photographs to help Shuttle crews stay on top of photography opportunities.

Advanced Launch System contracts awarded

Development efforts to focus on reliable, low-cost liquid-fueled engines

NASA has chosen three companies for negotiations leading to the award of five contracts to develop, demonstrate and mature new propulsion technologies for the Advanced Launch System (ALS).

The objective is to demonstrate highly reliable, low-cost engine components for the liquid-fueled engines as part of the joint NASA and Department of Defense program. Propulsion advanced development efforts will focus on integration of innovative, simplified designs, mate-

rials, fabrication processes and production features in large components.

The propulsion system components include turbomachinery for liquid oxygen, liquid hydrogen and liquid methane propellants, a propellant control effector system and the engine controller system.

Contracts will be awarded to Aerojet General Corp., Sacramento, Calif.; Rocketdyne Division, Rockwell International, Canoga Park, Calif.; and United Technology Corp., Pratt

and Whitney Division, West Palm Beach, Fla.

Under separate contracts, Aerojet will provide a liquid hydrogen turbopump, Rocketdyne will provide a liquid methane turbopump, and Pratt and Whitney will provide a liquid oxygen turbopump for the ALS. Each of these contracts, including options, is valued at approximately \$23 million.

Two additional contracts will be awarded to Aerojet. One, valued at approximately \$4 million, is for an engine propellant control effector

system. Another, valued at approximately \$3 million, is for an engine controller system.

The contracts, issued by Marshall Space Flight Center, require that the components provide high reliability with significant cost advantages over existing components in terms of first-unit cost, average-unit production cost and operational cost, including simplified test and launch site maintenance.

The contract efforts will be closely coordinated with the ongoing con-

tract definitions studies and planned Phase-B systems definition studies of the Space Transportation Main Engine (STME) and the Space Transportation Booster Engine (STBE). The STME is a gas-generator cycle engine using liquid oxygen and liquid hydrogen propellants, having a vacuum thrust level of 580,000 pounds. The STBE is a gas generator cycle engine, using liquid oxygen and liquid methane propellants, having a sea level thrust of 750,000 pounds.



JSC Photo by Sheri Dunnette

"Outstanding Speaker" awards were presented at the Speakers Bureau Awards dinner by JSC Director Aaron Cohen and Hal Stall, director of Public Affairs. From left are: Walter Scott Jr., Propulsion and Power Division; Robert Battey, Orbiter and GFE Projects office (retired); Karl Henize, Solar Systems Exploration; Barney Roberts, Lunar and Mars Exploration; Ann Patterson, Systems Engineering Office; Stall, Shayla Davidson, Tracking and Communications Division; Frank Hughes, Space Station Operations and Training; David Amsbury, Solar System Exploration; and Rodney Rocha, Structures and Mechanics Division.

Speakers Bureau gives honors

Fourteen of NASA's most active "ambassadors" were honored Tuesday for their contribution to the center at the JSC Speakers Bureau Dinner.

JSC Director Aaron Cohen, Director of Public Affairs Hal Stall and Juanie Campbell, JSC Speakers Bureau coordinator, hosted the awards banquet, which also featured local commentator and Texas historian Ray Miller, at the Gilruth Recreation Center.

Cohen congratulated the honorees and told the 100 people attending, "It is their personal contact that makes an impression and gets our message across to the public. Increased knowledge inspires confidence and gains public support ... support that is crucial at this time," he said.

The JSC Speakers Bureau, created in the mid-'60s, is the most active of all the speaker programs located at all the NASA centers. It has proven to be a most effective means of informing the public about NASA programs, as well as sharing agency accomplishments with the surrounding community.

"The enthusiasm about the space program which inspires most employees to decide to join the speakers bureau spills over into the audience," explained Campbell. "We have groups requesting speakers year after year—and have never had a

complaint about any presentation we've given."

At the dinner, Cohen presented Distinguished Speaker Awards to Kyle Fairchild of the New Initiatives Office, and Gary Kitmacher of the Man Systems Division. He congratulated the recipients on their "outstanding work" (both had given more than 24 presentations to groups within the past four years), and their "personal commitment to the manned space flight program."

Outstanding Speaker Awards were presented by Stall to the top 12 of the 30 JSC employees who contributed the most hours of personal time preparing and presenting their talks.

The JSC Speakers Bureau supports 200-300 requests annually, from professional organizations, schools and educational groups, and civic groups. "I've noticed a 50 percent increase in speaking requests since we started flying again last year," Campbell said.

Shayla Davidson of the Tracking and Communications Division, has spoken to student groups from elementary school through college. "The young audiences are the most enthusiastic, I mean—space is where they want to be," she said.

"I think Speakers Bureau is a great way for NASA employees to get out and meet the people and carry the message," she added. "Besides, it's good for me too. I

always come back from a talk energized."

While Davidson exclusively speaks to groups within driving distance of JSC, Kyle Fairchild, New Initiatives manager for technology and enterprise, and one of the two distinguished speaker award honorees, has traveled throughout the U.S. and Canada. He finds the extra hours of work and preparation as good for his job as it is for his frame of mind.

"When I talk to the public about the economic impact of manned Mars exploration, about Lunar Bases, I start considering aspects of the project other than engineering," he said. "Such as marketing considerations, or the effect projects of this magnitude might have on unemployment."

Fairchild says NASA employees "have a commitment to those on the outside. Children in schools should know that space is opening up, that in the future there will be a place in space for many different careers, not just astronauts and engineers. We have a responsibility to let taxpayers know what we're doing with their money, how technology in general can be used to invigorate the U.S. economy, what the future holds."

Employees interested in joining JSC's Speakers Bureau program may contact Juanie Campbell, Public Services Branch, for additional information.

Weitz to moderate 'all-hands' briefing panel discussion

JSC Director Aaron Cohen has scheduled an "all-hands" meeting for JSC employees at 2 p.m. March 31 in the Bldg. 2 Teague Auditorium.

The meeting, expected to last about one and a half hours, will be a panel discussion moderated by Deputy Director P.J. Weitz. Also participating on the panel will be Eugene F. Kranz, director of Mission Operations, Henry Pohl, director of Engineering, Richard Kohrs, deputy director of the National Space Transportation System Program Office, and Clarke Covington, manager of the Space Station Projects Office.

The panel will address topics of interest within each organization, discuss future activities of each organization, and explain how each organization is supporting JSC programs.

The panel members also will respond to employees' questions.

To assure that the meeting time is used most effectively, written questions are being solicited in advance. Typed questions must be mailed to Estella Gillette, Mail Code AH3, by March 17 to allow time for the panel participants to review them. For more information, call Estella Gillette at x33077.

Viewing room visits OK'd during mission

The Mission Control Center (MCC) viewing room will be open to JSC and contractor badged employees and their families at designated times during STS-29.

JSC Director Aaron Cohen said he hopes the opportunity to see Mission Control in action will give family members a better understanding of JSC's important mission.

"The employees have a desire to share their work at JSC with their families," Cohen said. "We hope these visiting hours will allow them to do just that."

If the launch occurs as expected on March 13, the viewing room will be open from 4-9 p.m. Tuesday

through Friday. If the launch slips or mission events dictate a change in the schedule, updates will be available on the Employee News Service telephone recording, x36765.

Employees must wear their badges and escort family members. They must enter the viewing room through the visitor area on the northeast side of Bldg. 30. Visitors should limit their stays during busy periods to afford the opportunity of viewing mission activities to as many employees as possible.

For more information, employees may call Barbara Schwartz in the Protocol Office at x35599.

'For All Mankind' makes Texas debut

A film that commemorates the efforts of thousands of NASA and JSC employees will make its Texas debut Saturday during the Galveston Film Festival.

"For All Mankind," the Celluloid history of the Apollo Program—made up entirely of official NASA film footage—will be shown at 8 p.m. in the Grand 1894 Opera House.

The film was directed by Al Reinert, who spent nine years going through the film archives at JSC with the help of veteran JSC film editor Don

Pickard. Audio experts Glenn Osborn, Mike Curie and Diana Ormsbee helped Reinert obtain the mission audio used in the film, which features a soundtrack by avant-garde composer Brian Eno.

To translate the images to the big screen, the original 16-millimeter film was blown up to 35 millimeters in JSC's Photography and Television Technology Division laboratory.

Tickets are available for \$10 each through the Galveston Arts Center, 409-763-2403.

Lunar conference sessions diverse

(Continued from page 1)

activities, unless otherwise listed, will be at the Rec Center. The schedule includes:

Monday: Mars Remote Sensing; Chondrules and Ordinary Chondrites; Cosmic Dust; Mars Remote Sensing/Mars Volcanism; Carbonaceous Chondrites; Shock Metamorphism and Terrestrial Craters; and Planetary Differentiation.

Tuesday: Mars Geology; Bholghati and Angrite Consortia Plus Pallasites; Cosmic Dust II Interstellar Grains/Dust; Mars—Water, Canyons, and Life; Ureilites, Ungrouped Chondrites & Nebular Processes; Lunar Geology, Processes and Resources; Opportunities in Solar System Exploration.

Wednesday: Venus Geophysics;

CAI's; Nature and Effects of Impact Cratering; JSC Astronomy Seminar; 20th Anniversary Plenary Review; and 20th Anniversary Banquet South Shore Harbour Hotel.

Thursday: Venus Geology; SNC's, HED's and Fellow Travelers; Regolith Cosmic Rays; Noon Forum; Origin and Crystallization of Mare Basalts Asteroids and Small Bodies; Chemical & Isotopic Characteristics of Solar System Material; Planetary Physics.

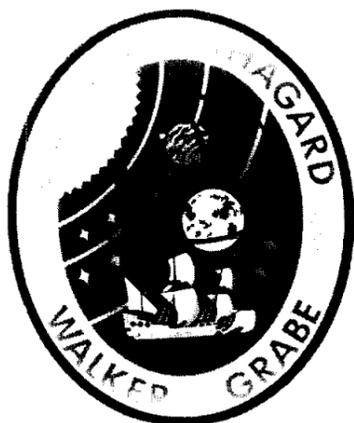
Friday: Magma Evolution in the Lunar Highlands; Planetary Accretion; and Outer Solar System.

Registration for the conference is \$40 plus a \$10 late fee for those registering after March 6. Registration will continue throughout the conference on the second floor of the Rec

Center.

Anyone interested in ticket information for the March 15 banquet should contact Pam Jones at 486-2150.

A separate conference on related topics will be held at 8 p.m. Monday in the Bldg. 2 Teague Auditorium. Speakers will give presentations related to "Science and Applications Topics in Lunar Base Planning." Speakers include: Michael Duke of JSC; G. Jeffrey Taylor from the University of New Mexico, Albuquerque; Harlan J. Smith from the University of Texas, Austin; Larry Haskin, Washington University, St. Louis, Mo.; and Harrison H. (Jack) Schmitt, Apollo 17 astronaut and former U.S. Senator from Albuquerque, N.M. The public is invited.



CREW PATCH—The STS-30 crew has released a crew insignia depicting the joining of NASA's manned and unmanned space programs with the Magellan flight.

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